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(72) Inventors PETER CHARLES HODGE and ROBERT KEITH CROSS

(19)

(54) PRESSURE TRANSDUCERS

(71) We, SIMMS GROUP RESEARCH & DEVELOPMENT LIMITED, a British Company, of Well Street, Birmingham B19 2XF, formerly of Concord Road, Western Avenue, Acton, London W3, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to pressure transducers for providing an electrical signal representative of the pressure within a conduit.

The object of the invention is to provide such a transducer in a simple and convenient form.

A pressure transducer in accordance with the invention comprises in combination, a magnetisable core structure defining a central cylindrical pole and four arcuate pole pieces, said pole pieces being spaced outwardly from said cylindrical pole and equiangularly spaced about the axis of the pole, a movable member positioned adjacent one end face of the cylindrical pole and extending diametrically relative to the axis of the cylindrical pole, said member being formed from magnetisable material and having a width at its extremities substantially equal to the arcuate length of the pole pieces, an energising winding for inducing a fluctuating magnetic flux in the core structure, output windings mounted about said pole pieces respectively, said output windings being electrically connected so that an output signal is obtained which represents the angular setting of the member relative to the axis of the pole, a bourdon tube, an inlet member communicating with the bourdon tube, and means connecting the bourdon tube and movable member whereby flexure of the tube due to changes in the pressure within a conduit connected to said inlet member will alter the angular setting of the movable member.

One example of a pressure transducer in accordance with the invention will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a plan view of the transducer, and

Figure 2 is an exploded view of a portion of the transducer seen in Figure 1.

Referring to the drawings the transducer comprises a core structure 10 which is formed from magnetisable material, and which defines a central cylindrical pole 11 having a central bore 12 extending therethrough. The pole 11 is formed integrally with an end portion 13 and integrally formed with the end portion are arcuate poles pieces 14 extending in the same direction as the pole 11. The pole pieces 14 are of arcuate form and are equiangularly spaced about the axis of the pole. Moreover, the end faces of the pole pieces 14 and the pole 11, remote from the plate 13, lie in a common plane.

Surrounding the pole 11 is an energising winding 15 through which in use is passed a fluctuating electric current whereby a fluctuating magnetic flux will be produced in the core structure. Surrounding the pole pieces 14 respectively, are output windings 16.

There is also provided a rotor in the form of a member 17, and this is pivotally mounted about the axis of the bore 12. The member 17 is formed from magnetisable material and extends diametrically relative to its axis of movement. Moreover, it is positioned adjacent to the aforesaid end faces of the core and pole pieces, and has a diametral length substantially equal to the overall diameter of the core structure 10. The end portions of the member 17 are of arcuate form and have an arcuate length substantially equal to the arcuate length of the pole pieces 14. Moreover, the portion of the member interconnecting the ends thereof, has a width substantially equal to the diameter of the pole 11.

The transducer also includes a bourdon tube 18 which is anchored at one end in a member 19, the latter defining an inlet communicating with the interior of the

bourdon tube, and adapted for connection to a conduit. At its other end the bourdon tube is closed, and defines a flattened portion 20 in which is formed an aperture which receives a link 21. The other end of the link 21 is pivotally connected to an extension 22 mounted on the member 17.

In the position shown in Figure 1, no fluid pressure is applied to the bourdon tube, and the member 17 assumes a position in which it bridges a pair of opposed pole pieces 14. As a result the voltage induced in the windings surrounding these pole pieces will be at a maximum, and the voltage induced in the windings surrounding the other pair of opposed pole pieces will be at a minimum. As pressure is increased in the interior of the bourdon tube, the latter will flex, and the member 17 will move angularly. As a result of this angular movement, the voltage induced in the windings surrounding the first mentioned pair of pole pieces will reduce, whilst the voltage induced in the windings surrounding the other pair of pole pieces will increase.

The windings are interconnected in such a manner that the voltages induced in an opposed pair of windings are added and are subtracted from the added voltages induced in the other opposed pair of windings. As a result the output voltage will be at a minimum when the member 17 lies midway between a pair of adjacent pole pieces, 14.

WHAT WE CLAIM IS:—

1. A pressure transducer for providing an electrical signal representative of the pressure within a conduit, the transducer comprising in combination, a magnetisable core structure defining a central cylindrical pole and four arcuate pole pieces, said pole pieces being spaced outwardly from said cylindrical pole and equiangularly spaced about the axis of the pole, a movable member positioned adjacent one end face of the cylindrical pole and extending diametrically relative to the axis of the cylindrical pole, said member being formed from magnetisable material and having a width at its extremities substantially equal to the arcuate length of the pole pieces, an energising winding for inducing a fluctuating magnetic flux in the core structure, output windings mounted about said pole pieces respectively, said output windings being electrically connected so that an output signal is obtained which represents the angular setting of the member relative to the axis of the pole, a bourdon tube, an inlet member communicating with the bourdon tube, and means connecting the bourdon tube and movable member whereby flexure of the tube due to changes in the pressure within a conduit connected to said inlet member will alter the angular setting of the movable member.

2. A transducer as claimed in claim 1 in which said movable member has arcuate extremities the width of the intervening portion of the movable member being substantially equal to the diameter of said cylindrical pole.

3. A transducer as claimed in claim 2 in which said bourdon tube is anchored at one end to said inlet member, the other end of said bourdon tube being pivotally connected by means of a link to an extension secured to said movable member.

4. A transducer as claimed in any one of the preceding claims in which the windings on an opposed pair of poles are connected together so that the voltages induced therein are added and are subtracted from the added voltages induced in the windings on the other opposed poles.

5. A pressure transducer for providing an electrical signal representative of the pressure within a conduit substantially as hereinbefore described with reference to the accompanying drawings.

MARKS & CLERK,
Lombard House,
144, Great Charles Street,
Birmingham, 3.
Agents for the Applicants.

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2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

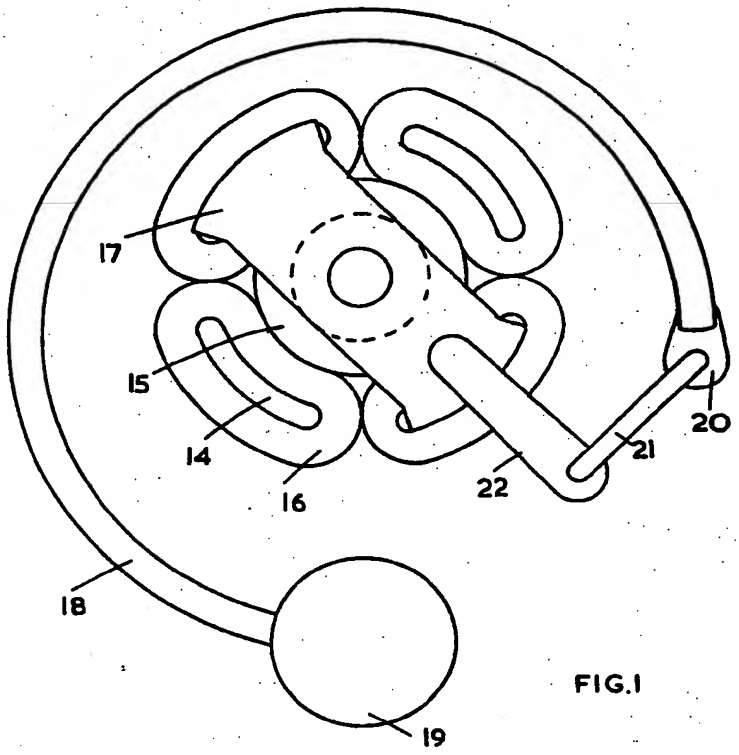

FIG.1

1451899 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

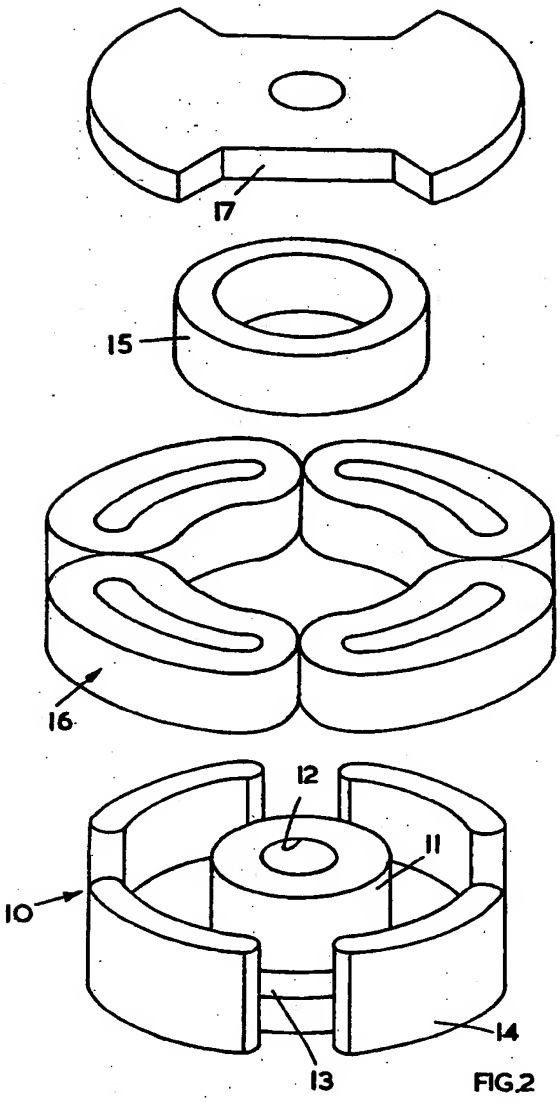

FIG.2